

What is claimed is:

1. A method for locating areas in a mask layout of an integrated circuit which are impacted by aberrations in projection printing comprising the steps of:

- a) generating a description of a mask layout,
- b) generating a description of an aberration function,
- c) sequentially comparing the aberration function to the mask layout geometry as the mask layout is scanned using an algorithm based on edges of the mask layout, and
- d) identifying any area in the mask layout tending to match the aberration function.

2. The method as defined by claim 1 wherein in step c) only pixels along edges of the mask layout are stored and compared with the aberration function.

3. The method as defined by claim 2 wherein the layout is partitioned and each partition is sequentially compared.

4. The method as defined by claim 2 wherein pixel values for a line are cumulatively weighed along the line whereby a weight for a line segment is obtained from a beginning pixel value and an end pixel value for the line segment.

5. The method as defined by claim 4 wherein the weight for a line segment is obtained by subtracting an end pixel value from the beginning pixel value.

6. The method as defined by claim 3 wherein step c) rank orders all mask layout edges, corners, and other geometries according to degree of similarity to the aberration function.

7. The method as defined by claim 6 wherein the description of the aberration function is modeled as producing spillover between mask openings with a localized pattern that is the inverse Fourier transform of the optical path difference function in the pupil of the projection printing system.

8. The method as defined by claim 7 wherein step d) rank orders locations based on match factors of the layout geometry and the aberration function.

9. The method as defined by claim 7 and further including step e) modifying the mask layout in response to identified matches with an aberration function.

10. The method as defined by claim 9 wherein step b) includes generating descriptions of a plurality of aberration functions and step c) compares the plurality of aberration functions to the mask layout.

11. The method as defined in claim 1 wherein step b) includes generating descriptions of a plurality of aberration functions and step c) compares the plurality of aberration functions to the mask layout.

12. A method for locating areas in a mask layout for an integrated circuit which are impacted by aberrations in projection printing comprising the steps of:

- a) generating a description of a mask layout,
- b) generating a description of an aberration function,
- c) sequentially comparing the aberration function to the mask layout as the mask layout is scanned using an algorithm based on rectangles in the mask layout, and
- d) identifying any area in the mask layout tending to match the aberration function.

13. The method as defined by claim 12 wherein the layout is partitioned and partitions are sequentially compared.

14. The method as defined by claim 12 wherein the mask layout is partitioned into rectangles and step c) compares rectangles in the mask layout to the description of the aberration function.

15. The method as defined by claim 14 wherein each pixel in a rectangle has a cumulative weight based on the pattern pixel weight in the rectangle above and to one side of the weighted pixel.

16. The method as defined by claim 15 wherein step c) rank orders all mask layout edges, corners, and other geometries according to degree of similarity to the aberration function.
- 5 17. The method as defined by claim 16 wherein the description of the aberration function is modeled as producing spillover between mask openings with a localized pattern that is the inverse Fourier transform of the optical path difference function in the pupil of the projection printing system.
- 10 18. The method as defined by claim 17 wherein polygons are split into rectangles utilizing a core matching procedure.
- 15 19. The method as defined by claim 18 wherein the polygons are split into a close-to-minimum number of rectangles, the entire input layout is partitioned into groups of rectangles, and the edges and corners are extracted from the rectangles and used to filter the match locations.
20. The method as defined by claim 18 wherein step d) rank orders locations based on match factors of the layout geometry and the aberration function.
- 20 21. The method as defined by claim 18 and further including step e) modifying the mask layout in response to identified matches with an aberration function.
- 25 22. The method as defined by claim 21 wherein step b) includes generating descriptions of a plurality of aberration functions and step c) compares the plurality of aberration functions to the mask layout.

23. The method as defined in claim 12 wherein step b) includes generating descriptions of a plurality of aberration functions and step c) compares the plurality of aberration functions to the mask layout.

24. The method as defined by claim 12 wherein in step a) the mask layout is partitioned into rectangles and triangles and step c) compares rectangles and triangles in the mask layout to the description of the aberration function.

25. A method for comparing one image to another image comprising the steps of:

- a) generating a description of a first image,
- b) generating a description of a second image, and
- c) sequentially comparing the second image description to the first image description to identify areas of similarity or dissimilarity, the comparing being based on corresponding geometrical patterns in the first and second images.

26. The method as defined by claim 25 wherein the geometric patterns are lines in the images.

27. The method as defined by claim 25 wherein the geometric patterns include rectangles in the images.

28. The method as defined by claim 27 wherein the geometric patterns include triangles in the images.

29. The method as defined by claim 25 wherein the geometric patterns include triangles in the images.

30. The method as defined by claim 25 wherein at least one image is a photo mask pattern.

31. The method as defined by claim 25 wherein the images are handwriting.

32. The method as defined by claim 25 wherein the images are photographs.

33. In a process for comparing geometric shapes in a mask layout for a description of an aberration function, a method for defining the geometric shapes comprising the steps of:

- 5           a) cumulatively weighting pixels in each geometric shape, and  
           b) storing only the cumulative weights for selected pixels.

34. The method as defined by claim 33 wherein the pixel values for a line are cumulatively weighted along the line whereby a weight for a line segment is obtained from a beginning pixel  
10 value and an end pixel value for the line segment.

35. The method as defined by claim 33 wherein a pixel value for a rectangle has a cumulative weight based on pixel weight in the rectangle above and to one side of the weighted pixel.